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Fall 2005

Tennessee Engineer Fall 2005

College of Engineering

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Building the Future of Engineering Education and Research

The College of Engineering has been waiting since 1962 for the construction of a new engineering building.

As of July 2005, the wait is over as planning begins for not one, but two new engineering facilities on the UT Knoxville campus.

"We are thrilled that we have reached this milestone," said COE Dean Way Kuo. "This is an unprecedented event in the history of our college."

The Min Kao Electrical and Computer Engineering Building

The construction of a new engineering building was one of the main goals on Kuo's agenda when he was named dean in June 2004. The cumulative effect of years of tight budgets had created an urgent need for upgraded classrooms and laboratories, and had resulted in a severe space shortage. Many of the college's existing facilities, including Perkins and Dougherty Halls, were far down the list of state capital improvement priorities. Estabrook Hall, the second-oldest building on campus, was near the top, but college administrators had been waiting almost eight years for state approval of renovation funding.

Enter Dr. Min Kao, chairman and CEO of the Garmin Corporation, one of the world's largest manufacturers of Global Positioning Systems (GPS) products.

Kao, who received his M.S. and Ph.D. degrees in electrical engineering from UT in 1975 and 1977, respectively, had stayed in touch through the years with his faculty advisor, James Hung. In early 2004, Kao contacted Hung regarding the possibility of making a gift of lasting value to the university. Hung suggested donating funds for a new electrical and computer engineering building.

Dr. Samir El-Ghazaly, professor and head of the Department of Electrical and Computer Engineering, was out of town on business when he received an urgent phone call from Hung requesting a meeting. When the two professors finally got together, Hung told El-Ghazaly that an anonymous donor had approached him with an offer of a \$1 million donation to provide scholarships to the Department of Electrical and Computer Engineering (ECE). Delighted at the news, El-Ghazaly was even more surprised to hear that the same donor was considering a major gift to a university for a building, and that UT had a very good chance of being the recipient.

UT and COE administrators worked diligently to create an exciting proposal for the new building. Their efforts paid off when Kao committed to providing \$12.5 million for the facility.

"It was a dream turned into reality," El-Ghazaly commented. "The magnitude of this truly transformational gift is huge."

Kao's donation for the new facility allowed UT and COE administrators to approach Tennessee's governor, Phil Bredesen, with a proposal to see if the funding could be matched by the state in order to expedite the construction of the building. Bredesen included the \$25 million in his proposed 2005-2006 budget, and the state legislature approved the funding in June of 2005, enhancing the building initiative to a total of \$37.5 million.

The new 150,000 square foot building will be constructed on the east side of the Hill between the Dougherty Engineering Building and Cumberland Avenue. It will include two "clean rooms" to create microelectronic devices and nanotechnology-related fabrications. The building is the campus's first new engineering facility since the Dougherty Engineering Building was constructed in 1962. The facility will be named the Min Kao Electrical and Computer Engineering Building in honor of Dr. Kao's generosity.

"I am fortunate to be in a position to give back to a university that did so much for me," Kao said. "The University of Tennessee opened its doors and offered me an opportunity to grow in my field. I hope the new facility will allow others to pursue their dreams and will further position UT as a gateway to great things in engineering and innovation."

Kao also pledged an additional \$5 million to match other private donations up to the same amount, with the goal of generating a \$10 million endowment for the Department of Electrical and Computer Engineering. This unique public-private partnership will allow the re-named Min H. Kao Department of Electrical and Computer Engineering to offer world-class educational and research opportunities.

"Obviously, we will include state-of-the-art laboratories for education and research and modern classrooms in the new building," El-Ghazaly stated. "We will provide the students with a much more comfortable and appropriate learning environment."

Continued on page 6

Historic \$17.5 Million Gift to Fund Construction of New ECE Facility



COE alumnus Dr. Min Kao (center) was accompanied by his wife Fan and son Kenneth during his visit to UT in 2004, prior to finalizing the largest private donation ever bestowed upon the university.



College of Engineering Dean Way Kuo (right) addressed the media at the site chosen for construction of the Min Kao Electrical and Computer Engineering Building.



Dr. Kao (right) spoke with electrical and computer engineering students David Scaperroth and Lance Schmieder during his 2004 campus visit.

DEAN'S *message*

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Editor's Note

Welcome to the Fall 2005 edition of *Tennessee Engineer*.

Our focus in this issue is on **facilities**. These are exciting times for both the University of Tennessee and the College of Engineering, with the upcoming construction of a new building and a reconstructed facility now a reality. We hope you enjoy learning more about these projects and what they will mean to the future of the COE and our students.

On another note, the Office of Engineering Communications makes every effort to insure that the content in all of our publications is accurate. However, errors do occasionally happen, and the Spring 2005 "From the Dean's Desk" contained an inaccurate figure. The average ACT score for incoming COE freshmen for the Fall 2004 semester was 26.3, not 32.8 as was reported. We apologize for the error.

As always, we welcome your feedback. Please send your comments to kcowart@utk.edu.

We hope you enjoy this issue of *Tennessee Engineer*.

—Kim Cowart, Editor

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From the Dean's Desk



The College of Engineering has received more than its share of good news recently. Commitments from a distinguished alumnus, private donors and the state government have created an infusion of new funding for the college, and have provided us with an unprecedented opportunity to expand our educational programs and research initiatives.

Dr. Min Kao, CEO and Chairman of Garmin Corporation and a UT electrical engineering graduate, is the alumnus whose magnificent generosity to the college has helped to launch several wonderful initiatives. Earlier this year, Dr. Kao provided a transformational gift of \$17.5 million, the largest private donation in UT history. The \$12.5 million designated from this donation for a new electrical and computer engineering building helped UT and COE administrators convince Governor Phil Bredesen to expedite the project with an additional \$25 million. The other \$5 million from Dr. Kao's gift will be used to match dollar-for-dollar donations to the Department of Electrical and Computer Engineering with the goal of setting up a \$10 million endowment for the department. Both the building and the department will be named after Dr. Kao.

In June 2005, the Tennessee legislature generously provided \$16.6 million for the revitalization of Estabrook Hall, which will house the Department of Civil and Environmental Engineering (CEE), now located in Perkins Hall. Estabrook has been on the state's list for capital improvement projects for many years. The renovation of Estabrook as a new home for the CEE department frees up significant space for the newly revitalized Industrial and Information Engineering Department and four of our five research center offices in Perkins Hall.

The new buildings obviously provide an opportunity for state-of-the-art facilities for research and instruction and offer our engineering programs tremendous opportunities to attract outstanding faculty and students.

Last year, after the implementation of the state's HOPE Scholarship Program, the freshman engineering class increased 36% from 395 in Fall 2003 to 537 in Fall 2004. For the Fall 2005 semester, the overall entering freshman class at the University of Tennessee grew by more than 20%, and this group of freshmen have an impressive average ACT score of 25.7 and a 3.55 grade point average—signs that the university is now attracting the state's best and brightest students.

UT Knoxville Chancellor Loren Crabtree has projected that, in light of current trends, total enrollment at UT will expand to a total of 27,300 students within the next two to three years. It is my hope that the COE will eventually double our current enrollment of 2,500 students. These new facilities will play an important role in providing us with the capabilities necessary to meet the demands of a growing student body.

Thanks to the generosity of Dr. Kao, Governor Bredesen, and the Tennessee State Legislature, the future of our college is limitless. As always, we are grateful for the ongoing support that our college receives from Chancellor Crabtree, UT President John Petersen and our private donors and alumni. The commitments to these initiatives offer us exceptional opportunities for the UT College of Engineering to reach the goal to be ranked among the top engineering schools in the United States.

Our best is yet to come.

Way Kuo
Dean of Engineering and
University Distinguished Professor

New Associate Dean, Interim CEE Department Head and MCEC Director Named

The University of Tennessee College of Engineering has named **Dr. Alberto Garcia**, formerly a professor and director of undergraduate programs for the Department of Industrial Engineering at Texas A&M University, as the college's new Associate Dean for Academic Affairs.

Garcia received his B.S. degree in industrial engineering from the Industrial University of Santander, Colombia, and his M.S. and Ph.D. degrees in industrial engineering from the University of Illinois at Urbana-Champaign. He was given the Association of Former Students of Texas A&M University's Distinguished Achievement Award for Teaching, College of Engineering in 2003, and is a Fellow of the Institute of Industrial Engineers and a licensed Professional Engineer in the state of Texas.

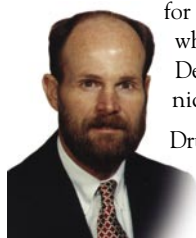
Garcia is the author of four books, including *Facilities Planning and Design*, which will be published this year, as well as numerous journal, proceedings and technical articles and reports.



Dr. Alberto Garcia

He has also been appointed as a full professor in the college's Department of Industrial and Information Engineering.

The college also announced the selection of **Dr. Eric Drumm** as interim head of the Department of Civil and Environmental Engineering (CEE), effective July 1, 2005. Drumm will be filling in for longtime head Dr. Greg Reed, who was named as Interim Dean of the College of Communications as of July 1, 2005.



Dr. Eric Drumm

Drumm received his Ph.D. from the University of Arizona, and is the recipient of several teaching and research awards, including the College of Engineering Research Fellow Award in 2004 and 2005 and the Ferris Faculty Award. He serves as the Faculty Advisor to the Student Chapter of the American Society of Civil Engineers, and is a registered Professional Engineer.

The college has appointed **Dr. Richard J. Jendrucko** as the new director of the Measurement and Control Engineering Center (MCEC).

Jendrucko received his Ph.D. from the University of Virginia and is a professor and former associate department head for the Department of Mechanical, Aerospace and Biomedical Engineering.



Dr. Richard Jendrucko

Jendrucko also served for 17 years as director of the DOE-funded Industrial Assessment Center at UT, which provided energy conservation, waste reduction and productivity enhancement technical assistance to over 300 regional industrial manufacturers. He was named a Shell Professor in 2003, was recognized by the Association of Energy Engineers with the Engineer of the Year Award for the Southeast Region in 2000 and is a licensed Professional Engineer.

The MCEC is an Industry/University Cooperative Research Center organized under the auspices of the National Science Foundation (NSF). Its mission is to accelerate the development and implementation of measurement and control technology by serving as a national center for research and teaching in these technologies based on the needs of industrial sponsors.

Faculty Focus

Dr. Kenneth Kihm, the COE's Magnavox Professor in the Department of Mechanical, Aerospace and Biomedical Engineering, is pioneering the relatively new field of micro/nano fluidics and transport. During his sixteen-year career with Texas A&M, Kihm established an interdisciplinary research field in micro/nano-scale transport, using advanced laser diagnostic techniques with an active interest in developing non-intrusive bio-sensing tools.

Through his innovations of micro/nano transport phenomena and biomedical applications, Kihm has become most enthusiastic about his work on the development and implementation of sub-microscale optical diagnostic techniques for tracking nanoparticles with a spatial measurement resolution of a few nanometers—that's less than 1/1,000th of a human hair.

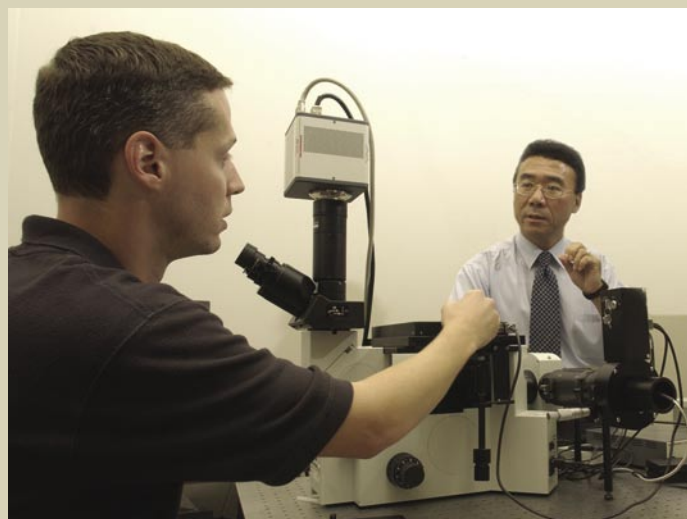
"There are two purposes for such study," said Kihm. "One is to study the scientific phenomenon of energy transfer of metallic nanoparticles in suspension, and two, to delineate biomedical transport of living cells, such as the tracking and transport of nanomedicines in and out of cells."

Kihm's current research contributes to the exploration of engineering properties for high throughput cytometry (the mechanized counting and measuring of cells) for target cells such as cancer cells and stem cells. "Cancer cells are difficult to study because they have very challenging characteristics. They're not uniquely

defined and vary from cell to cell," said Kihm. "One way to alleviate challenges will be to deal with statistics and large data sets, searching for consistencies. Engineers can identify possibly more distinctive properties from an engineering point of view to add to those marks already identified from a biomedical point of view.

"For example, cancer cells are softer than other cells—they're made to grow and have no cytoskeletons. Thus, the elasticity of a cell can be considered as a distinctive mark for the pertinent cytometry. Other engineering properties such as density, stickiness and temperature may lead to better identification of such target cells. The joint force of engineering and biomedical will result in better solutions. It's a long term goal."

Kihm said that the interdisciplinary developments between micro/nano engineering and the biomedical sciences will have far-reaching effects: "I emphasize to graduate students that they should begin early with an interdisciplinary approach to avoid some of those challenges.



Dr. Kihm (right) works with Ph.D. candidate Chuck Margraves as they prepare a sample to examine the hindered brownian motion of nano-sized particles using an Olympus IX-51 inverted microscope.

A truly interdisciplinary field of micro/nano fluidics is one that advances into a new area. We all should explore interdisciplinary growth of traditionally subdivided fields connected to the diverse biomedical areas ranging from the day-to-day capsuled lives of astronauts to medical breakthroughs in cell research."

"Biomedical applications will grow," said Kihm. "Some areas in engineering have come and gone. But micro/nano engineering is just beginning. The medical arena demands continued exploration."

Continued on page 4

College of Engineering 2005 Honors Banquet

The College of Engineering's 2004-2005 Honors Banquet took place Tuesday, April 12 at the University Center Ballroom. The event, sponsored by Eastman Chemical Company, is held annually to recognize outstanding faculty, staff, students and alumni.

The theme for this year's fête was "Infinite Possibilities," echoing the impressive progress of the college in the past year.

Dr. Masood Parang, Associate Dean for Student Affairs, welcomed guests and honorees and served as emcee. Speakers at the event included Dr. Way Kuo, Dean of Engineering and a University Distinguished Professor; Mr. Richard D. Witt, P.E., Eastman Chemical Company's Vice President of Worldwide Operations Support; Jennifer Cole, a senior in the Department of Nuclear Engineering; and Dr. Dayakar Penumadu, a professor in the Department of Civil and Environmental Engineering.



Mr. Bill Elmore

The COE's corporate speaker was Mr. Bill R. Elmore, Senior Vice President and Chief Operating Officer of the Knoxville Utilities Board. Mr. Malcolm Colditz (BS/ChE '58), President of Sea Lion Technology Inc., gave the evening's alumni/donor address.

College-wide awards included:

- Outstanding Support Staff Award—Mr. Douglas Fielden, Technical Supervisor III in the Department of Chemical Engineering
- Outstanding Faculty Advisor—Dr. Gary V. Smith, Department of Mechanical, Aerospace and Biomedical Engineering



Jennifer Allison (left) receives the 2005 Eastman Chemical Company Chemical Engineering Scholar Award from Mr. Richard Witt.



COE alumnus Dr. Mark Dean (right) is presented with the Nathan W. Dougherty Award by Dr. Way Kuo.

- Allen & Hoshall Engineering Faculty Award—Dr. Chris D. Cox, Department of Civil and Environmental Engineering
- Moses E. and Mayme Brooks Distinguished Professor Award—Dr. J. Wesley Hines, Department of Nuclear Engineering
- The Leon and Nancy Cole Superior Teaching Award—Dr. Michael J. Roberts, Department of Electrical and Computer Engineering
- College of Engineering 2005 Teaching Fellow Award—Dr. Joseph Spruiell, Department of Materials Science and Engineering
- Charles Edward Ferris Faculty Award—Dr. Paul B. Crilly, Department of Electrical and Computer Engineering

The college's most prestigious recognition, the Nathan W. Dougherty Award, was presented to COE alumnus Dr. Mark E. Dean, Vice President and IBM Fellow, IBM Almaden Research Center. Dean received his bachelor's degree in electrical engineering from UT in 1979. He holds three of the original nine patents on the standard IBM standard personal desktop computer that served as a basis for all personal computers. He has received numerous awards and honors, including induction into the National Inventors Hall of Fame, the third African American to receive that honor.

Dr. Parang closed the evening by expressing the college's congratulations to all award winners.

—Story by Betsy Saylor

Faculty Focus

Continued from page 3

As much as he enjoys research, Kihm also feels strongly about teaching. His primary teaching interest has been in the optics and optical techniques for both an undergraduate elective and a graduate course. "In my heart I'm a teacher," said Kihm. "A teacher can be a good researcher, but it doesn't always work the other way around. The day I received the Teaching Excellence Award from the Association of Former Students at Texas A&M was the day I felt most prestigious," said Kihm. He keeps an open-door policy, always welcoming any questions from students.

Kihm received both his B.S. and M.S. in mechanical engineering from Seoul National University in Korea, and his Ph.D. from Stanford. He said he desires to dispel any misconceptions undergraduates may have about advanced engineering degrees. "Many undergrads have quick intuitions about mechanical engineering," he said. "They think of gears and heavy machinery—and yes, those are essential areas that are needed everyday. However, in grad school we try to innovate and implement new things beyond the quick intuitions in other areas of research as well."

The Micro/Nano Fluidics and Energy Transport (MINSFET) Lab's clean environment is well equipped with advanced optics for interdisciplinary research combining mechanical engineering with medical, materials science and other areas of research. "I like to find the path where I can show the grad students' diverse master activities to undergraduates to develop their research interests in advanced degrees," explained Kihm.

Kihm said he and his family are adjusting well to Tennessee since their arrival in August 2004, welcoming changes in climate, culture and geography. "The Knoxville area has year-round mild weather and beautiful mountains. I am quite happy now," he said. Kihm explained his wife, Jennie, is his best asset in obtaining his career goals: "I am a lucky guy. My wife has always been fully supportive of any direction I chose to take." His daughters, Grace, 15, and Christina, 14, like their new home.

As for leisure, Kihm joked that he feels "too young to play golf," but questions if his days are numbered on the racquetball courts. "It's good that the ball stays inside the court," he laughed, "So that I do not have to worry about the sand and the ponds."

For more information about Dr. Kihm and his research, the MINSFET Lab and micro/nano fluidics, please visit <http://minsfet.utk.edu>.

—Story by Betsy Saylor

Commencement Ceremony 2005



The second annual College of Engineering Commencement Ceremony took place on Saturday, May 7, 2005, with 205 engineering graduates receiving their degrees. Approximately 2,400 parents, friends and relatives also attended the event, which took place in the Knoxville Convention Center, Exhibition Hall B, at 11:30 a.m.

Dean Way Kuo led the academic procession that signaled the beginning of the ceremony. The procession included the college's associate deans, department heads and

faculty representatives. Dr. Masood Parang, Associate Dean of Student Affairs, presided over the degree presentation ceremony and recognized the top six College of Engineering graduates for their outstanding academic achievement: Mary Airhart and Tatiana Kyker, chemical engineering



majors; Benjamin Kant, Graham Nelson and Jill Weigand, mechanical engineering majors; and Lance Schmieder, electrical engineering major.

The keynote speaker for the event was Richard Snead (below), a 1973 College of Engineering industrial engineering graduate who is currently President and Chief Executive Officer (CEO) of Carlson Restaurants Worldwide Inc., the parent company of the



T.G.I. Friday's® and Pick Up Stix restaurant brands. In his address, Snead offered advice to students through a humorous "Top 10" format. Citing his own varied career, Snead also said that a degree in engineering provided a pathway to many different types of professions.

The Fall 2005 Commencement will be a university-wide event that will take place on Saturday, December 17th at Thompson-Boling Arena. For more information, contact the Engineering Student Affairs Office at (865) 974-2454.



Kimberly-Clark and OPP Host 8th Annual Cookout



The College of Engineering and the Office of Professional Practice (OPP) kicked-off the school year with the Eighth Annual Kimberly-Clark/College of Engineering Cookout on September 2, offering COE students, faculty and staff the opportunity to meet and reconnect after the summer break. Over 900 people attended this year's cookout, enjoying free barbeque, baked beans, potato salad and soft drinks served in front of the Science Engineering and Research Facility.

The event provided a chance for students to learn about the OPP, which has recently added internships to provide ad-

ditional on-the-job training to students. In the relaxed atmosphere, students also gained familiarity with Kimberly-Clark, which has designated UT as a "core school" for recruiting new graduates and supporting faculty research.

Sponsor Kimberly-Clark is a \$14 billion global manufacturer of tissue, personal care and health products with operations in 41 countries. For more information, visit the OPP web site at <http://www.coop.utk.edu>.

—Story by Betsy Saylor



COE to Manage Center for Transportation Research

Administrative oversight of the university's Center for Transportation Research (CTR) has been transferred to the UT College of Engineering, effective July 1, 2005. The CTR is a multi-disciplinary research center affiliated with educational disciplines including civil and environmental engineering, marketing, logistics and geography. The CTR conducts and facilitates interdisciplinary research, public service and training in the field of transportation to meet the needs of government, business and industry across the southeast.

Since its inception over 30 years ago, the CTR has experienced steady growth with current contracts totaling over \$10 million. In recent years, the CTR partnered with Oak Ridge National Laboratory, the Department of Energy, UT Battelle and the Development Corporation of Knox County to create the National Transportation Research Center (NTRC). The state-of-the-art NTRC facility is home to ongoing research projects in areas that include information systems, truck safety and regulation, traffic operations, ITS, environmental impact and transportation safety.

The CTR is also the lead institution of the U.S. Department of Transportation's Southeastern Transportation Center (STC). Each year the STC supports approximately 80 students in transportation-related disciplines at 10 southeastern universities.

Under the guidance of director Dr. Steve Richards, the CTR's staff of over 125 research, technical and support personnel works with a variety of constituencies and programs, including the operation of the Tennessee Transportation Assistance Program (TTAP), funded by the Federal Highway Administration and the Tennessee Department of Transportation. Each year this program offers technical assistance, seminars and training courses to local government transportation agencies to provide them with the expertise needed to effectively cope with complicated transportation issues.

"We are looking forward to working with Dr. Richards and his staff as well as university faculty and student researchers to make 2006 an even greater year for enhancing the research, service and education missions of our university," said Wayne Davis, the COE's Associate Dean for Research and Technology. "We welcome the Center for Transportation Research into this new working relationship."

For more information, visit the CTR's web site at <http://ctr.utk.edu>.

Building the Future

Continued from page 1

George Criss, UT's Director of Facilities Planning, said that the State Building Commission has approved the project, and surveys and preliminary site analyses are currently taking place. The Knoxville firms of Bullock, Smith and Partners and Lindsay and Maples Architects have been selected to design the new ECE building. Both firms have extensive experience with UT-Knoxville capital projects. Lindsay and Maples Architects designed the Science and Engineering Research Facility (SERF), and Bullock, Smith and Partners were the designers of the Biotechnology Research Facility on the UT agricultural campus.

"Since we are an urban campus, almost every building site is a challenge," Criss commented. "The new ECE building site has similar building conditions that we faced for SERF in the early '90s. The SERF building took about 24 months, and I foresee right now that the new ECE building will take about that length of time to complete."

COE Dean Way Kuo said the new building is the result of collaborative efforts between Kao, UT administrators and state officials.

"Dr. Kao's gift provided us with the chance to put a new engineering building before the governor and the state legislatures as a viable option," Kuo said.

As if a \$37.5 million donation and the prospect of a new building did not provide enough good news, the state legislature also approved \$16.6 million in funding for the reconstruction of Estabrook Hall.

ECE Challenge Gains Momentum

The ECE Challenge Campaign, a joint effort between the Electrical and Computer Engineering department, the Engineering Development Office and the UT Office of Alumni Affairs, has already made progress in meeting the designated goal of \$5 million. The campaign was initiated when Dr. Min Kao, who had also donated \$12.5 million to the construction of a new ECE building, pledged \$5 million to match funds from private donors in order to generate a \$10 million endowment for the department.

As this publication went to press, the ECE Challenge Campaign has raised just over \$1,050,000 in private support from individuals, corporations and foundations with additional efforts underway for several significant pledges.

For more information on the ECE Challenge Campaign, contact the Engineering Development Office at (865) 974-2779 or e-mail pwshea@utk.edu.



State Allocates \$16.6 Million to Rebuild Estabrook

◀ The updated Estabrook will keep its classic facade and while having its interior replaced with state-of-the-art classrooms, research labs and offices.

▼ Completed over 115 years ago, Estabrook was the heart of the engineering campus for decades.

Estabrook Hall Reconstruction

Estabrook, completed in 1889, is the second-oldest building on campus. The 57,292 square foot building is named for Joseph Estabrook, the fifth president of the University of Tennessee, Knoxville.

"Estabrook was a nice surprise," Criss said. "It will provide the engineering college with an additional up-to-date facility. The firms of Grieve and Associates and Pro 2 Serve, a multi-disciplinary architectural and engineering group, have been selected for the project"

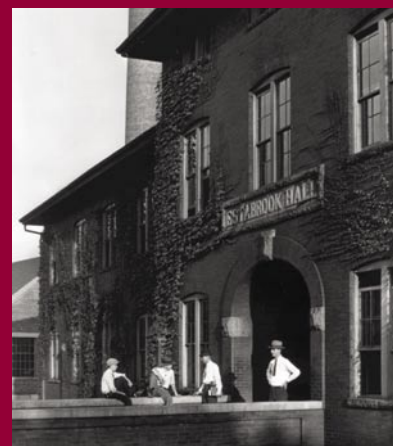
The improved facility will most likely provide about 59,000 square feet and will house the Department of Civil and Environmental Engineering.

"The renovated Estabrook will provide us with an opportunity to consolidate our entire faculty and all research space in one building," commented Eric Drumm, Interim Department Head for CEE. "All of our faculty and staff offices, labs, and even classroom space will be included. A reconstructed building with 21st Century infrastructure will greatly facilitate us in achieving our teaching and research missions."

Plans are to raze Berry Hall, the small 7,140 square foot building behind Estabrook, to allow more space for the Estabrook project. Berry, built in 1939, is currently being used by CEE for office and research space.

"We are working to have the final plans in place within the next few months," said Wayne Davis, the COE's Associate Dean for Research and Technology, who directs the college's facilities planning. "We will have to do a lot of moving around when construction actually begins on these buildings."

Davis predicts that the construction of Estabrook will take place about six months behind the new ECE building, since the existing occupants will need to be temporarily relocated to other facilities. Space on campus is now at a premium,



since several major projects are currently in the works, including the College of Business Administration's Glocker Hall; a new aquatic facility; renovation of Neyland Stadium; and the completion of the Hesler Biology Building Phase II, scheduled for early 2006.

UT, Knoxville Chancellor Loren Crabtree sees the new facilities as part of a bigger picture.

"The quality of our students has increased dramatically," Crabtree commented. "This fall, the average freshman's ACT score was 25.7 and the average high school GPA was 3.55. These students will come in larger numbers to disciplines such as engineering and the sciences. We are also seeing an increase in the number of students; we had over 12,000 applicants for 4,200 slots in the freshman class this fall. It is only a matter of time before we will need to increase our enrollment, but in order to do that we must have the facilities and faculty to meet the needs of an expanded number of students. These new buildings provide us with a real opportunity to make a difference for our students, for the university and for the State of Tennessee."

For more information on Dr. Min Kao, read "Alumni Profile" on page 8.

—Story by Kim Cowart

UT's GATE Program Allotted \$625,000 for Development of Hybrid Vehicles

If sticker shock at the gas pumps is getting you down, Dr. David "Butch" Irick has help on the way.

A research assistant professor in the Department of Mechanical, Aerospace and Biomedical Engineering, Irick is also the director of the college's seven-year-old Graduate Automotive Technology Education program (GATE). GATE was a recent recipient of \$625,000 in funding from the Department of Energy (DOE) and the university for the updating and expansion of its initiatives in the area of advanced hybrid vehicle propulsion and control systems.

"In light of the current national situation, as energy costs increase, the urgency to develop alternative fuel vehicles is even greater," Irick said. "The automotive industry projects that sales of hybrid vehicles will increase by 80% over the next year. People are looking to hybrids as a solution to higher gas prices."

The GATE program's goal is to provide training to a future workforce of interdisciplinary automotive engineering professionals who have experience in developing and commercializing cost-effective, fuel-efficient vehicles.

UT is one of only eight national universities with a GATE Center of Excellence. Recipients of this year's grants receive funding to support graduate fellowships and to create new courses and update current offerings to reflect emergent technologies in automotive engineering. Irick said the UT GATE center will focus on development of optimal strategies for powertrain control and systems integration. The primary area of concentration for UT's GATE program will continue to be hybrid electric vehicles.

The establishment of a GATE Center at UT was a natural fit, Irick said, since the university has been entering alternative fuel vehicle competitions continuously for over 18 years. Last year, retiring professor Jeffrey Hodgson was honored for his 15-year stint as an advisor of UT teams and his leadership role in the establishment of the GATE center. The university has received nearly \$3.3 million in contracts and resources as a result of participation in the alternative-fuel vehicle competitions.

Irick is fielding another UT team in the current Challenge X competition, sponsored by General Motors, which began in 2004. The COE's vehicle, a 2005 Chevrolet Equinox, was just delivered in July, and modifications are already taking place for the year-two competition of the three-year challenge at the GM Desert Proving Grounds in June of 2006.



Mechanical engineering students begin modifications to the drivetrain of the 2005 Chevrolet Equinox which will be transformed into a hybrid electric vehicle with funding from DOE's Challenge X competition.

Irick and his students plan to attend a Challenge X workshop in Auburn Hills, Michigan, in early October.

And if all else fails, Irick has an ace up his sleeve. He is working with the student Society of Automotive Engineers chapter at UT to develop biodiesel fuel from waste cooking oil, supplied by the university's dining halls. The group received a \$10,000 grant from UT during last spring's "Environmental Semester" for the project.

"We're going to use the fuel in our own vehicles and some of the physical plant's vehicles as well," Irick commented. "There are normally costs associated with disposing of the waste cooking oil by a contract service; we intend to turn that process into a net plus in energy as well as operating cost. The biodiesel-based fuel also reduces the emissions of air pollutants such as nitrogen oxides and particulate matter, when compared to conventional fossil fuel-based diesel fuel."

—Story by Kim Cowart

College of Engineering • Board of Advisors

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(BS/NE '65, MS/NE '67, PhD/NE '71)
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Knoxville, Tenn.

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Boeing Production System
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Operations
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Mr. Dennis R. Ruddy
President and General Manager
BWXT-Y12, LLC
Oak Ridge, Tenn.

Mr. Richard T. Snead
(BS/IE '73)
President and CEO
Carlson Restaurants Worldwide
Carrollton, Texas

Mr. Mike Young
(BS/CE '71, MS/EnvE '72)
Senior Vice President/CEO
Allen and Hoshall, Inc.
Memphis, Tenn.

Alumnus Min Kao Draws on Education to Navigate GPS Technology Company

When Min Kao applied for a teaching assistantship to continue his graduate studies in engineering at the University of Tennessee, Knoxville, he could never have imagined that his name would one day grace a department and a building on the university's engineering campus.

Dr. Min H. Kao, a native of Taiwan, received his bachelor's degree in electrical engineering from the National Taiwan University in Taipei. After graduation, he decided to apply to schools in the United States for his postgraduate studies. He was offered a teaching assistantship at the University of Tennessee, which helped to pay for his tuition and expenses. Coincidentally, his brother was also a student at Vanderbilt University, so the proximity of Knoxville to Nashville made UTK an appropriate choice.

During his years as a graduate student, Kao worked on research projects under the guidance of now-retired ECE professors Dr. James Hung and Dr. Robert Bodenheimer.

"I found the University of Tennessee's engineering program to be very practical, and a logical next step to the theory I studied at National Taiwan University," Kao said. "Looking back, I can see how well this training has served me throughout my career. Of course, some of the things I enjoyed most about my days at UT were the various research projects that I undertook under the supervision of Dr. Hung and Dr. Bodenheimer."

Hung remembers Kao as a hard-working and bright student.

"I met Min Kao in the fall of 1973 when he arrived at UT, Knoxville, where he had been awarded a graduate teaching assistantship," Hung commented. "I was his major advisor for his master's and his doctoral programs. I was sure that he would be very successful in his profession, since he came to us from the best university in Taiwan."

After receiving his master's and Ph.D. degrees in electrical engineering from UT in 1975 and 1977, respectively, Kao accepted a position at Teledyne, where he was involved in the development of various navigation systems. He was employed for stints at Magnavox and King Radio (which later was sold to AlliedSignal, and eventually to Honeywell), but eventually Kao decided to join forces with a former King

Radio colleague, Gary Burrell, to start their own company. Both had extensive experience in navigation systems; Kao had led the Global Positioning Systems (GPS) team that developed the first GPS receiver certified by the Federal Aviation Administration.

"My partner Gary Burrell and I were a couple of engineers who had great enthusiasm for the future of GPS technology, but we lacked any experience in running a company," Kao added.

The company, initially named ProNav and later re-named Garmin—a play on the first names of the founders—introduced its flagship GPS product for the domestic marine market, and shortly thereafter expanded to international marine and aviation applications. Burrell and Kao established their first office in Lenexa, Kansas, in 1989, and started to build up their US campus at the current Kansas City suburb location in 1996.

Currently a world leader in aviation,

marine, recreational, fitness and automotive GPS markets, Garmin has reported significant growth over the past 15 years. The company employs nearly 3,000 employees worldwide and has facilities in Kansas, Oregon, Arizona, Taiwan and England. Garmin has shipped more than 10 million GPS navigation, communication and information devices.

"We operate our business contrary to what you see from most companies today, where the focus is on outsourcing and down sizing," Kao said. "Instead, we focus on insourcing and creating jobs. We implement a vertical integration concept for which we design, develop and market every product under the Garmin name."

Kao had stayed in touch with Hung after graduating, and it was Hung whom Kao first contacted with the idea of providing a gift of lasting value to a university—potentially, his alma mater, the University of Tennessee.

"I was very happy when I realized that he had the idea to help the university," Hung said.

Kao's generous gift of \$17.5 million to the Department of Electrical and Computer Engineering—\$12.5 million that is designated for a new building and \$5 million in matching funds to generate an endowment of \$10 million—is the largest

private gift in UT, Knoxville's history. Both the new building and the ECE department will be named after Kao in honor of his generosity.

Kao envisions the new facility and funding as paving the way for an expanded ECE program that still provides instruction in the core engineering principles.

"I would encourage the university to focus on the fundamental science and engineering studies," Kao commented. "A solid foundation in the practical applications of electrical and computer education is imperative. Secondly, I would emphasize creative and innovative product design. I would like for students to experience the thrill of embedded systems design and discovery and realize the potential they have to create products that can change lives."

Hung hopes his former student's gift will be a catalyst for achievement for both the department and the college.

"I am sure, with the new building and additional funding, that the ECE Department is in a better position to fulfill its mission of teaching, research and public service. I know Min Kao wants to see the department also produce graduates who are industry savvy," Hung commented.

Prior to the announcement of the gift, Kao modestly stayed in the background, remaining anonymous while details were being worked out and only revealing his name after the arrangements were final, preferring to keep the focus on the building and fund-raising initiatives.

Kao will continue to lead Garmin, where he has plans for future growth.

"Our company has enjoyed significant growth for more than 15 years, and we still see incredible opportunities ahead. I intend to lead, learn and enjoy the next phase of Garmin's life. I feel our best efforts are still to come," Kao added.

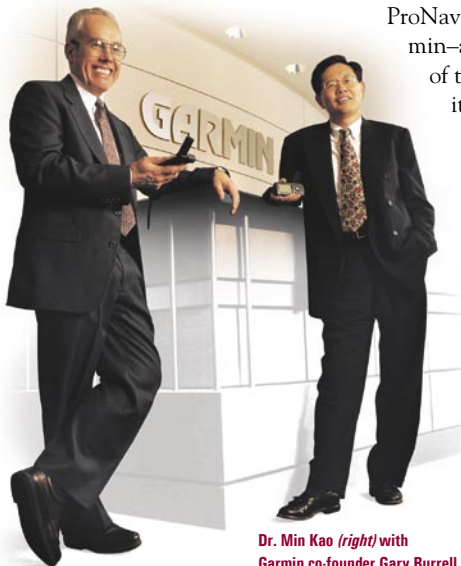
He also hopes to make time for travel and family activities with his wife, Fan, and their two adult children.

Plans are also in the works for Kao to attend the building's dedication ceremony.

"Knoxville offers significant fond memories, since it was my first U.S. city experience. I found the community very friendly and its people most helpful. A recent visit reminded me that those qualities haven't changed," Kao said. "I will certainly be on hand for the excitement of the facility's dedication."

For more information on the new Min H. Kao Electrical and Computer Engineering Building and the Min H. Kao Electrical and Computer Engineering Department, please visit the College of Engineering's web site at <http://www.engr.utk.edu>.

—Story by Kim Cowart



Dr. Min Kao (right) with
Garmin co-founder Gary Burrell.

Talley Family Establishes Weston Miller Fulton Memorial Scholarship

Mrs. Jean Fulton Talley and her husband, James C. Talley II, have established the Weston Miller Fulton Memorial Scholarship to honor the many accomplishments of Mrs. Talley's father, Mr. Fulton—devoted family man, capitalist and inventor.

The Talleys have included the bequest to the College of Engineering's Department of Electrical and Computer Engineering (ECE) in their estate plans.

"My father was such a generous man, he gave so much to so many," Mrs. Talley said. "I know he would be honored that we are presenting this gift in his name to the university he loved so much."

Weston Miller Fulton was born on August 3, 1871, in Hale, Alabama, to William and Mary Brown Fulton. As a young child, Fulton worked the cotton fields of their family farm. His parents made sure that he received an education, attending the best schools in both Alabama and Mississippi. He excelled in his studies, and upon entering college, decided to concentrate his efforts in the field of meteorology. In 1892, he earned a Bachelor of Arts Degree (with highest honors) from the University of Mississippi at Oxford and soon took the Civil Service exam that earned him an appointment as meteorologist with the weather bureau in Vicksburg, Miss.

Fulton accepted an appointment to the Knoxville Weather Bureau in 1898. While attending to his duties as weather forecaster, Fulton also began taking an interest in science courses offered at UT, and soon became a dedicated student and teacher. During his tenure at UT (1898-1903), he served on the science faculty and continued his studies. At one point, Fulton began experimenting to find a way to measure the fluctuating levels of the Tennessee River. Subsequently, he devised an automatic river gauge that caught the attention of the US Government and became the subject of a special government bulletin. In 1902, Fulton was awarded a Master of Science Degree from the University of Tennessee.

One of Fulton's most notable inventions was the "Sylphon"—named in honor of Sylph, the Norse goddess of the atmosphere. While studying the action of electricity on a mixture of gas and vapors, like water vapor and air in the atmosphere, he needed a device for confining such a mixture so he could study the effects of temperature changes upon it. He eventually succeeded in producing a seamless corrugated bellows from a thin-walled metal tube.

Initially the Sylphon, and the mechanisms that went with it, opened and closed draft doors on coal furnaces and automatically regulated the thermostatic flow of gas-to-gas furnaces and ovens. During World War I, this invention took on



Mrs. Jean Fulton Talley (left) and her husband James C. Talley II have established a new scholarship for engineering students in honor of Mrs. Talley's father, Weston Miller Fulton.

a critical role to help shorten the conflict against Germany. As the result of a casual conversation with War Department agents in 1917 who were looking for factories that might be converted to produce wartime materials, Fulton expressed how his bellows device could be installed on an underwater bomb to set it off when it sank to a pre-set depth, thus destroying many enemy submarines. Fulton's depth bomb mechanism gave the Allies their best weapon for destroying German submarines as they attacked the convoys.

Additional far-reaching applications of the Sylphon range from the cooling systems on automobiles and refrigerators to eventual uses in satellites, space shuttles and jet liners. The bellows-like device for thermostatic control of temperature led to the founding of the Fulton Company in 1904, where many of his inventions were manufactured.

In 1930, Fulton sold the Fulton Sylphon Company (previously known as the Fulton Company) and in subsequent years he broadened his business interests to include the W. J. Savage Company (1930-36), the Tennessee Odin Insurance Company (1935-46) and the Royal Manufacturing Company (1940-45). At the time of Fulton's unexpected death in 1946, he was working on an automatically controlled stoker for coal burning furnaces. Mrs. Talley noted that this was the happiest she had ever seen him with regard to his work—this invention was inspired by his desire to help rid cities of smoke. Fulton held patents on more than 200 inventions; at one time the

US Patent Office in Washington had an entire room devoted to his devices.

As Fulton's wealth grew, so did his generosity. He was active in Knoxville and Tennessee government, serving as Vice-Mayor of Knoxville, and was involved in numerous charities and organizations including the Masons, the board of the Chamber of Commerce and the YMCA; he was also one of the early leaders in the Great Smoky Mountains Conservation Association.

Fulton was a devoted husband and father. He married the former Barbara Stuart Murrian in 1910 and together they raised five children—Buddy, Barbara, Robert, Jean and Mary. The oldest, Weston Miller Fulton, Jr. "Buddy" passed away suddenly in 1926. As a memorial to his son, Fulton donated the family home on present-day Volunteer Boulevard to the University of Tennessee. The house was used for years as the student health center.

Fulton had many passions—his family, his work, and the community in which he lived and served. He was also a fanatical University of Tennessee football fan.

"My dad loved UT football," Mrs. Talley commented. "He took me to the Rose Bowl to see UT play when I was only 15 years old. It was the national championship game. I've never forgotten how exciting it was to take that trip."

"I am not a college graduate, but both of our two children, their spouses, and all four of our grandchildren have their degrees," Mr. Talley said. "Several have graduated from UT. We believe in the power of education. Jean and I have been married for over 60 years, and we have had very good fortune over the course of our lives together. We wanted to establish this endowment not only for her father, but also to honor our family."

"We are so pleased that Mr. and Mrs. Talley have selected the College of Engineering for their generous gift," said Patty Shea, Interim Development Director. "This is a particularly auspicious time to donate to the ECE Department, since we are currently working to raise funds to match Dr. Min Kao's \$5 million endowment pledge during the ECE Challenge Campaign."

The COE development office provides assistance to alumni and friends of the college with estate planning and in establishing endowments for specific scholarship and/or program funding. For more information, contact Ms. Shea at (865) 974-5516 or at pwshea@utk.edu.

—Story by Patty Shea and Kim Cowart

Sources for this article include *The Knoxville News-Sentinel* (1946-1989), *the Knoxville Journal* (1982) and *the Tennessee Star Journal* (1999).

1940s

W. Lewis Wood Jr. (BS/EE '49) was honored at the 179th Infantry Regiment's B Company reunion for heroic service in Korea during 1951 and 1952. Wood lives in Memphis.

1950s

William E. Warde (BS/EE '50) retired as an engineering manager. He lives in Louisville, Ky.

O.H. "Shorty" Freeland (BS/ME '51) is president of F & M Consulting of Savannah, Tenn. He lives in Adamsville, Tenn.

1960s

Dr. Edgar Lucian Mohundro (BS/ChE '62; MS/ChE '67; PhD/ChE '70) is a chemical engineering consultant. He lives in Loudon, Tenn.

Dr. David O. Patterson (BS/EPh '62) has retired from Defense Advanced Research Projects Agency. He lives in Virginia Beach, Va.

Richard M. Martin (BS/EPh '64) is a physics professor at the University of Illinois at Urbana-Champaign. Martin's book, *Electronic Structure: Basic Theory and Methods*, was published recently. He lives in Champaign, Ill.

Ronnie Ewing Phillips (BS/ME '67) retired from BWXT Y-12 in Oak Ridge, Tenn. He lives in Powell, Tenn.

1970s

Herbert L. Bradshaw II (BS/IE '73; MS/IE '77) is an operation manager with Thomas & Betts Corp. He lives in Athens, Tenn.

Patricia Stone Harmon (BS/MechSci '78) is manager of structures integration with Pratt & Whitney in East Hartford, Conn. She lives in Middle Haddam, Conn.

Jerry Lee McMurray (BS/ChE '78) is a process safety coordinator with Solutia Inc. in Decatur, Ala. He lives in Madison, Ala.

1980s

John A. Farquharson (BS/ME '80) is a group leader for ABS Consulting in Knoxville. He lives in Clinton, Tenn.

Jim Copley (BS/CE '81; MS/CE '83) is president and CEO of Crom Corp., a builder of pre-stressed concrete tanks in Gainesville, Fla.

Susan Gail Joseph-Reel (BS/EE '82) is the first woman general chairman of the Instrumentation, Systems, and Automation Society's International Instrumentation Symposium.

Daniel Maxey (BS/CE '82) was the lead designer and engineer of record for bridge plans in the November 2004 repairs of I-10 bridges damaged by Hurricane Ivan in September 2004. Maxey is a registered professional engineer in Fla., N.C., Ga. and Tenn.

Mark S.A. Smith (BS/EE '82) recently released two books, *Linux In the Boardroom: How Linux is Changing Corporate Computing and What Executives Need to Know and Do About It*, and *Security in the Boardroom: The Impact of Physical and Network Security on Corporations and What Executives Need to Know and Do About It*.

Chris Milan (BS/ME, '87) received the Administrator's Excellence Award for Unsung Hero from the Department of Energy's Bonneville Power Administration. The award is one of the highest honors given to employees who show outstanding innovation, initiative, superior service or courageous acts that have made an exceptional contribution to BPA's mission, the electric utility industry or the community. Milan developed a software program to calculate energy savings and also authored the *Guidebook for Performing Industrial Energy Audits*.

Brian Andrews Parks (BS/ME '87) is vice president of technical sales with Gulf Digital Solutions in Dubai, United Arab Emirates. He lives in Dubai.

Richard John Wilk (BS/PolyE '87) is an administrative officer for MIT in Cambridge, Mass. He lives in Arlington, Mass.

Dr. Thomas William Nipper II (BS/IE '89) is a general medical officer with the U.S. Navy. Nipper received his medical degree from the UT Health Science Center in 2003.

1990s

Brian James Burgio (BS/IE '90) is back in Texas after being in Saudi Arabia. He lives in Katy, Texas.

Tony Alley (BS/ES '92) is the Senior Program Analyst for Biological Detection Systems at the Joint Program Executive Office for Chemical and Biological Defense in Falls Creek, Va. He lives in Fredericksburg, Va.

Doug Brock (BS/EE '92) of Roden Electric Supply Company in Chattanooga, Tenn., was recently appointed by the Tennessee Center for Performance Excellence to the 2005 Board of Examiners. As an examiner, Brock will review and evaluate applications in the award process.

Susan Jenkins (MS/EE '93) works with the Air Protection Branch—Planning & Support Program—Planning & Regulatory Development Unit of the Georgia Department of Natural Resources. She lives in Atlanta, Ga.

Virginia "Jenny" McGrath Weaver M.D. (BS/ES '93) was inducted into the Lady Vols Hall of Fame in October 2004. She earned a medical degree in 1997 from the UT Health Science Center. Weaver is on the staff of St. Francis Hospital in Memphis.

Daniel Alan Boss (BS/CE '94) is a process engineer with Nuclear Fuel Services in Erwin, Tenn. He lives in Johnson City, Tenn.

Charlie T. Rose (BS/ME '95) is president of Handyman Matters in Shelbyville, Tenn. He lives in Shelbyville.

Dr. James Patrick McClanahan (BS/NE '96; MS/NE '98; PhD/NE '03) is at Oak Ridge National Laboratory in a post-doctoral position. He lives in Knoxville.

Holly Ann Ellis McClung (BS/IE '96) is a process engineer for General Motors. She lives in Franklin, Tenn.

Bradley E. "Brad" Baucom (BS/EE '97) is a senior engineer with TVA in Chattanooga, Tenn. He lives in Chattanooga.

Eric Oglesby (BS/IE '97; MS/IE '03) is the JCATS Administrator/Vulnerability Analyst at BWXT Y-12. He lives in Knoxville.

Dr. David C. Paulus (BS/ME '99; MS/IE '01) is a professor with the University of Arkansas-Fort Smith. He lives in Fort Smith.

Michael David White (BS/CE '99) is a project engineer with HNTB Corporation in San Francisco, Calif. He lives in Richmond, Calif.

2000s

Tara Bussell Boldridge (BS/IE '00) is a process improvement engineer with Hallmark Cards Inc. in Leavenworth, Kan. She lives in Shawnee, Kan.

Jawanza Y. Jones (BS/ChE '00) is a sales engineer with Calgon Carbon Corp. Jones lives in Vero Beach, Fla.

Robert F. Cornett (BS/EE '01) is an electrical engineer with the Tennessee Valley Authority in Spring City, Tenn. He lives in Knoxville.

Michael Robert Ellis (BS/EE '01) is an electrical engineer with BWXT Y-12 in Oak Ridge, Tenn. He lives in Knoxville.

Jatuporn "Jack" Sarisun (BS/ME '01) is a mechanical engineer for the Naval Aviation Depot based at the Marine Corps Air Station in Cherry Point, N.C. He lives in Havelock, N.C.

Jennifer W. Park Gideon (BS/IE '02) is a quality engineer with Tyco Healthcare. She lives in Simpsonville, S.C.

Richard Todd McDaniels (BS/CE '02) is an engineer/scientist for Shaw Environmental Infrastructure in Denver, Colo. He lives in Westminster, Colo.

Christina Leann Miller (BS/IE '02) is an industrial engineer with Nissan North America Inc. in Smyrna, Tenn. She lives in Antioch, Tenn.

Lance Edward Rasnake (BS/CE '02) is a staff engineer with AMEC Earth and Environmental in Knoxville. He lives in Knoxville.

April Michelle Banner (BS/ME '03) is an applications engineer with ARC Automotive Inc. She lives in Knoxville.

Charles H. Hamblin (BS/CE '03; MS/CE '04) is a structural designer with Ross Bryan Associates Inc. in Nashville. He lives in Joelton, Tenn.

Kanak P. Patel (BS/EE '03) is an electronics engineer with the Department of Defense at Robins Air Force Base in Warner Robins, Ga. He lives in Centerville, Ga.

Brandon Jaekobi Williams (BS/EE '03) is a process engineer for Engineered Products Group with Johns Manville, a Berkshire Hathaway Company. He lives in Athens, Tenn.

Memorials

Dr. John Wilson Thomas Dabbs (BS/ME '44) died November 17, 2004. He was a resident of Oak Ridge, Tenn. Dabbs was retired from a career as a physicist at Oak Ridge National Laboratory.

Elbert Kelsey "Sonny" Coggins III (BS/IE '57; MS/IE '61) died December 13, 2004. He lived in Tupelo, Miss. Retired from Miss Eaton, Coggins had been in management with the furniture industry for a number of years.

William Gilbert Gregg (BS/IE '60) died November 16, 2004. He lived in Kingston, Tenn. Gregg retired from a 28-year career as an industrial engineer with K-25.

Charles Eddie Chesnutt (BS/EE '62) died November 5, 2004. He lived in Ooltewah, Tenn., and was retired from DuPont.

Gilbert L. Payne (BS/NE '75) died October 29, 2004. He lived in Knoxville.

HONORS

& awards

Group Receives \$825,000 DOE Hydrogen Research Grant

Four professors from the COE's Department of Chemical Engineering working with a colleague from Oak Ridge National Laboratory (ORNL) have received an \$825,000 grant from the U.S. Department of Energy (DOE) for their project "A Unified Computational, Theoretical and Experimental Investigation of Proton Transport through the Electrode/Electrolyte Interface of Proton Exchange Membrane Fuel Cell Systems." The team consists of Principal Investigator Dr. David Keffer, and Dr. Brian Edwards, associate professors in chemical engineering; Shengting Cui, ChE research professor; Dr. Bill Steele, ChE adjunct professor and staff scientist with ORNL's Nuclear Science & Technology Division; and Dr. Costas Tsouris, ORNL staff scientist and joint professor at Georgia Tech's School of Civil and Environmental Engineering.

DOE has approved \$64 million over the next three years for 70 hydrogen research and development grant recipients. By participating in the hydrogen research development projects, Keffer's research group will be contributing to the DOE's ultimate goal of making hydrogen fuel cell vehicles and refueling stations accessible and practical for Americans by 2020.



Hydrogen research group discussion—team members (left to right) Dr. Brian Edwards, Dr. David Keffer, and Dr. Bill Steele meet with ChE graduate students Carrie Gao and Junwu Liu and ChE research professor Dr. Shengting Cui to begin investigation of a hydrogen fuel cell system. Also in attendance was ChE graduate student Johanna Santiago (not pictured).

Paper Earns Liu American Institute of Physics Award

Dr. C.T. Liu, Distinguished Research Professor in materials science engineering at ORNL's Metals and Ceramics Division, has received one of the American Institute of Physics' "Top Physics Stories of 2004" awards. The paper, titled "Structural Amorphous Steels," addressed the fabrication of amorphous steel, with large cross-sections, that has a hardness and strength more than twice that of the best ultra-high-strength conventional steel—long a goal of metallurgists.



Dr. C.T. Liu

The paper was coauthored by Zhou Ping Lu, ORNL's Metals and Ceramics Division; J. R. Thompson, ORNL's Condensed Matter Science Division and the UT Department of Physics; and W. D. Porter, ORNL's Metals and Ceramics Division.

Uhrig Awarded ASME Medal



Dr. Robert Uhrig

Dr. Robert E. Uhrig, a Distinguished UT/ORNL Scientist Emeritus and professor of nuclear engineering, is the recipient of the 2005 American Society of Mechanical Engineers (ASME) Medal, awarded "for more than five decades of high achievement and leadership in the power field, resulting in safer and more effective power generation." The award includes a \$15,000 honorarium, gold medal and certificate.

Uhrig's work at both UT and ORNL concerns the application of artificial intelligence methods, primarily expert systems and neural networks, to nuclear materials and systems. Uhrig has authored over 150 technical and professional publications and two books.

Bhat Elected Fellow of The Textile Institute

Dr. Gajanan Bhat, professor of materials science and engineering, has been elected as a Fellow of The Textile Institute in recognition of his contributions to the field of textiles. This honor is an outstanding career accomplishment in the field of textile science. The Textile Institute was incorporated in 1925, is a registered charity, has members in more than 90 countries and is one of the premier organizations for textile scientists all over the world.



Dr. Gajanan Bhat

Ford Appointed Performance Excellence Examiner

Dr. Robert Ford, research assistant professor in industrial and information engineering, has been appointed to the Tennessee Center for Performance Excellence's Board of Examiners for its 2005 Awards Program which recognizes organizations demonstrating excellence in business operations and results.



Dr. Robert Ford

As an examiner, Ford is responsible for reviewing and evaluating applications submitted in the award process. The Board of Examiners comprises experts from all sectors, including business, industry, education and health care organizations, professional and trade associations and government. Those selected meet the highest standards of achievement and peer recognition in their fields. All members of the board must complete extensive training in the Baldrige Criteria for Performance Excellence.

MS-MBA Program to Benefit from \$600,000 Grant

Dr. Arnold Lumsdaine, associate professor in mechanical engineering, has received the National Science Foundation Partnership for Innovation grant for \$600,000 over the next two years to enhance the developing MS-MBA degree program through the initiative "Innovation and Entrepreneurship in Product Development and Commercialization."



Dr. Arnold Lumsdaine

Others involved in the project include Dr. Billie Collier, professor in materials science and engineering and Associate Vice Chancellor; Dr. Frank H. Speckhart, professor in mechanical, aerospace and biomedical engineering; Dr. Kenneth Kahn, associate professor in marketing and logistics; and Dean Way Kuo. The overall goal of the project is to develop the entrepreneurial focus, increase recruiting efforts and move toward expansion of the new MS-MBA program. The main focus of the program is to equip graduate and undergraduate engineering students with the skills to initiate technology-based companies.

Calendar

2005

| | |
|-------------------------|------------|
| Engineers Day | Oct. 20 |
| Homecoming | Nov. 12 |
| Thanksgiving | Nov. 24-25 |
| Classes End | Dec. 6 |
| Fall Commencement | Dec. 17 |

2006

| | |
|---------------------------|------------|
| Classes Begin | Jan. 11 |
| King Holiday | Jan. 16 |
| Spring Break | Mar. 20-24 |
| Spring Recess Day | Apr. 14 |
| Classes End | Apr. 28 |
| Spring Commencement | May 12 |

Contact Information

Senior Administration

Dr. Way Kuo, Dean of Engineering and University Distinguished Professor

Dr. Alberto Garcia, Associate Dean for Academic Affairs

Dr. Masood Parang, Associate Dean for Student Affairs

Dr. Wayne T. Davis, Associate Dean for Research & Technology

Administration & Programs

| | |
|-----------------------------------|----------|
| Academic Affairs | 974-6092 |
| Communications | 974-0533 |
| Co-op Engineering | 974-5323 |
| Dean's Office | 974-5321 |
| Development | 974-2779 |
| Engineering Diversity | 974-2454 |
| Engage | 974-9810 |
| Engineering Student Affairs | 974-2454 |

Departments

| | |
|--|----------|
| Chemical | 974-2421 |
| Civil & Environmental | 974-2503 |
| Electrical & Computer | 974-3461 |
| Industrial & Information | 974-3333 |
| Materials Science | 974-5336 |
| Mechanical, Aerospace & Biomedical | 974-5115 |
| Nuclear | 974-2525 |

Research Centers

| | |
|------------------------------------|----------|
| Transportation Research | 974-5255 |
| Center for Homeland Security | 974-3339 |
| Materials Processing | 974-0816 |
| Maintenance & Reliability | 974-9625 |
| Measurement & Control | 974-2375 |



The University of Tennessee
College of Engineering
207 Perkins Hall
Knoxville, TN 37996-2012

HOMECOMING 2005



Saturday, November 12, 2005

UT vs. University of Memphis

Time TBA

Engineering Alumni Barbeque

Ferris and Perkins Courtyard

You are cordially invited to the annual College of Engineering Alumni Homecoming Barbeque on Saturday, November 12, prior to the UT vs. University of Memphis football game (gametime is TBA). The event begins four hours before the game starting time and food service ends one hour before kick-off.

Cost for the meal is \$15 per person and includes barbeque, side dishes and tea and soft drinks. The barbeque will be held in the courtyard between Perkins and Ferris Halls. Registration forms are in the fall *Torchbearer* magazine, or contact Peg Schneider in the Engineering Development Office at (865) 974-2779 or via email at mschnei1@utk.edu. Tickets for the football game must be purchased through the UT Alumni Office, (865) 974-3011.

The University of Tennessee does not discriminate on the basis of race, sex, color, religion, national origin, age, handicap or veteran status in provision of educational opportunities or employment opportunities and benefits.

UT does not discriminate on the basis of sex or handicap in its educational programs and activities pursuant to requirements of Title IX of the Education Amendments of 1972, Public Law 92-318; and Section 504 of the Rehabilitation Act of 1973, Public Law 93-112; and the Americans with Disabilities Act of 1990, Public Law 101-336, respectively. This policy extends to both employment by and admission to the university.

Inquiries concerning Title IX, Section 504, and the Americans with Disabilities Act of 1990 should be directed to the Office of Equity and Diversity; 1840 Melrose Avenue; The University of Tennessee; Knoxville, Tennessee 37996-0144; (865) 974-2498. Charges of violation of the above policy also should be directed to the Office of Equity and Diversity.

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